

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-15. Canceled.

16. (New) A rock boring device of the type comprising a disc cutter to engage a rock face and an inertial reaction mass to stabilize the disc cutter; wherein said disc cutter is structured to be driven in an oscillating manner and movable in a nutating manner.

17. (New) A rock boring device as claimed in claim 16, wherein said disc cutter is free to rotate.

18. (New) A rock boring device as claimed in claim 16, wherein said rock boring device includes a mounting section for said disc cutter and a driven section, and wherein said mounting section is angularly offset from an axis of said driven section whereby said disc cutter will both oscillate and nutate.

19. (New) A rock boring device as claimed in claim 18 wherein said mounting section is angularly offset from an axis of said driven section by an angle greater than 0° and less than 90°.

20. (New) A rock boring device as claimed in claim 18 wherein said mounting section is angularly offset from an axis of said driven section by an angle greater than 0° and less than 10°.

21. (New) A rock boring machine, incorporating a rock boring device as claimed in claim 16, wherein said rock boring device is mounted on a boom.

22. (New) A rock boring machine as claimed in claim 21, wherein said boom is adapted to pivot about a first axis.

23. (New) A rock boring machine as claimed in claim 22, wherein said boom is adapted to pivot about a second axis.

24. (New) A rock boring machine as claimed in claim 22, wherein said first axis is substantially vertical.

25. (New) A rock boring machine as claimed in claim 22, wherein said first axis is substantially horizontal.

26. (New) A rock boring machine as claimed in claim 21, wherein said rock boring device is supported by said boom such that said device is pivotable about a longitudinal axis of said boom.

27. (New) A rock boring machine as claimed in claim 21, wherein said rock boring device is supported to pivot relative to said boom.

28. (New) A rock boring machine as claimed in claim 21, wherein a plurality of said rock boring devices are carried by said rock boring machine.

29. (New) A rock boring machine as claimed in claim 21, wherein a linear cutting velocity of said rotary disc cutter is controlled by interaction with a computer that processes algorithms with variable information input being provided by strain gauges and accelerometers mounted adjacent to said rotary disc cutter.

30. (New) A rock boring machine as claimed in claim 21, including means to reference the position of the machine with respect to an operating rock face, thereby allowing a predetermined depth of cut to be maintained at said rock face throughout a cutting cycle.

31. (New) The rock boring machine as claimed in claim 30, wherein said machine is anchored with respect to said operating rock face thereby allowing a predetermined depth of cut to be maintained at said rock face throughout a cutting cycle.

32. (New) A rock boring device according to claim 16, wherein said disc cutter is driven in said nutating manner.

33. (New) A rock boring device according to claim 16, wherein said disc cutter is driven in said oscillating manner and is free to nutate.

34. (New) A rock boring device according to claim 16, wherein the disc cutter includes a tip to engage the rock face and heel positioned opposite said tip, wherein the tip and heel of the disc cutter define with ground a non-zero rake angle such that the heel is positioned to avoid contact with the rock face.

35. (New) A rock boring device according to claim 34, wherein the rake angle is variable.

36. (New) A rock boring device according to claim 32, wherein the disc cutter includes an outer cutting disc including at least one cutting surface.

37. (New) A rock boring device according to claim 36, wherein the cutting surface includes a plurality of cutting tips that are removably connected to the disc cutter.

38. (New) A rock boring device according to claim 36, wherein the cutting surface includes a plurality of cutting tips that are permanently connected to or formed as part of the disc cutter.

39. (New) A rock boring device according to claim 36, wherein the cutting surface includes a plurality of bits.

40. (New) A rock boring device according to claim 36, wherein the cutting surface includes a substantially continuous cutting ring.

41. (New) A rock boring device according to claim 36, wherein the outer cutting disc is mounted on a mounting head.

42. (New) A rock boring device according to claim 41, wherein at least one of the disc cutter and the mounting disc includes a channel through which pressurized fluid may be injected.

43. (New) A rock boring device according to claim 21, further comprising a mounting section for the disc cutter, the mounting section including a primary bearing substantially aligned with a load path of the disc cutter and a secondary bearing provided to preload the primary bearing.

44. (New) A rock boring device according to claim 43, wherein a reaction force created by engagement of the rock face is substantially along the line extending through the primary and secondary bearings.

45. (New) A rock boring device according to claim 21, wherein the inertial reaction mass substantially surrounds the disc cutter.

46. (New) A rock boring machine as claimed in claim 21, wherein the boom is structured to pivot about a first axis to allow global pivoting of the combined boom and disc cutter,

the boom is rotatable about a second axis that is substantially transverse to or perpendicular to the first axis, and

the disc cutter is structured to pivot about a third axis substantially perpendicular or transverse to the second axis, to allow local wrist-like pivoting movement of the disc cutter with respect to a distal end of the boom.

47. (New) A rock boring machine as claimed in claim 46, wherein the disc cutter is structured to pivot about the third axis in a first direction and the boom is structured to pivot about the first axis in a second direction, wherein the first and second directions are substantially the same just before the disc cutter engages the rock face.

48. (New) A rock boring machine as claimed in claim 21, wherein an end portion of the disc cutter is structured to move in a direction substantially along the rock face just before impacting a ledge protruding away from the rock face.

49. (New) A rock boring machine as claimed in claim 48, wherein the inertial reaction mass is structured, in use, to counteract an impact force created upon impact with the ledge.